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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,713	12/07/2001	Ryoichi Mukai	0671.66045	5134

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CHICAGO, IL 60606

EXAMINER
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RICKMAN, HOLLY C

ART UNIT	PAPER NUMBER
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1773

DATE MAILED: 05/21/2002

3

Please find below and/or attached an Office communication concerning this application or proceeding.

T.D-3

<b>Office Action Summary</b>	<b>Application No.</b> 10/008,713	<b>Applicant(s)</b> MUKAI, RYOICHI	
	<b>Examiner</b> Holly Rickman	<b>Art Unit</b> 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \*   c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____.  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: .  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "S4" in Figure 11 is not described in the specification. It appears that "S5" described in the specification corresponds to "S4" in Figure 11. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities: "grain" is misspelled on pages 2 and 9, lines 19 and 6, respectively. "Fluorocarbon" is misspelled on page 8, line 17.

Appropriate correction is required.

### ***Claim Objections***

3. Claim 4 is objected to because of the following informalities: "underlayer" is misspelled in line 3. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rendered indefinite by the limitation “magnetic layer...allowing deposition of an alloy of at least a kind of non-magnetic material and Co and also existence of Cr...near the crystal grain boundary of said alloy.” The use of the phrase “allowing deposition” suggests that a magnetic layer is deposited and an alloy having Co, Cr and a non-magnetic material is deposited thereon. However, according to the specification, it appears that the magnetic layer itself is made of Co, Cr and a non-magnetic material. It is suggested that Applicant amend the claim to read “a magnetic layer...comprising an alloy of at least one non-magnetic material and Co wherein Cr is present only at the crystal grain boundary of said alloy” or something comparable.

Claims 1, 4, and 7 are rendered indefinite by the phrase “a kind of non-magnetic material.” It is not clear what the term “kind” is intended to convey.

Claim 3 is rendered indefinite by the phrase “structured with two elements.” It is not clear what is meant by “structured.” Does this mean the Co alloy consists of two elements?

Claim 4 lacks antecedent basis for “the underlayer”, “the Cr-based non-magnetic material” and “the magnetic layer.”

Claim 5 lacks antecedent basis for “the post-annealing.”

Claim 6 lacks antecedent basis for “the sputtering method.”

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Claim 7 is rendered indefinite by the limitation “depositing an alloy of at least a kind of non-magnetic material and Co and also laminating a magnetic layer allowing existence of Cr only at the area near the crystal grains of said alloy.” It is not clear whether Applicant is claiming a first layer of Co and a non-magnetic material and a second layer formed from a magnetic layer containing Cr or a single magnetic layer containing Co, Cr, and a non-magnetic material as disclosed in the specification. The Examiner has interpreted the claim in light of the specification to be a single magnetic layer.

Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the thickness of the Cr-based non-magnetic underlayer. The specification states that sufficient magnetic characteristic cannot be achieved if the underlayer thickness is below 2 nm (p. 7, lines 4-11).

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the step of annealing at a temperature higher than 350° C. The specification states that diffusion of Cr to the crystal grain boundary of the magnetic layer from the underlayer is only induced at a post-annealing temperature higher than 350° C (p. 10, lines 4-10).

#### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

*written* 7. Claims 1 and 3~~5~~ rejected under 35 U.S.C. 102(b) as being anticipated by Mukai (US 5759617).

Mukai discloses a magnetic recording medium formed by sputtering a non-magnetic underlayer on a substrate, sputtering a magnetic layer on the underlayer and then annealing to diffuse components of the underlayer into the crystal boundaries of the magnetic layer. The reference teaches that the underlayer is formed from a material such as Cr and the magnetic layer is formed from an alloy such as CoCr, CoCrPt (col. 2, lines 17-31 and 38-43; col. 2, line 66 to col. 3, line 13).

8. Claims 4-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Kobayashi (JP 8-329464).

Kobayashi discloses a magnetic recording medium having a Cr underlayer that is sputtered onto a substrate, a CoSm magnetic alloy sputtered onto the Cr underlayer and a Cr layer sputtered onto the magnetic layer. The structure is then heat treated (post-annealed). In the instant case, Sm corresponds to the claimed “non-magnetic material different from Cr and Co.”

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukai (US

5759617).

Mukai discloses a magnetic recording medium formed by sputtering a non-magnetic underlayer on a substrate, sputtering a magnetic layer on the underlayer and then annealing to diffuse components of the underlayer into the crystal boundaries of the magnetic layer. The reference teaches that the underlayer is formed from a material such as Cr and the magnetic layer is formed from an alloy such as CoCr, CoCrPt (col. 2, lines 17-31 and 38-43; col. 2, line 66 to col. 3, line 13). Mukai is silent with respect to the amount of Cr that is diffused into the magnetic layer.

Mukai teaches that the presence of Cr or other non-magnetic material at the crystal boundaries of the magnetic layer helps improve coercivity and reduce noise levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the amount of Cr diffused into the magnetic layer in order to achieve optimal coercivity and reduced noise. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi (JP 8-329464).

Kobayashi discloses a magnetic recording medium having a Cr underlayer that is sputtered onto a substrate, a CoSm magnetic alloy sputtered onto the Cr underlayer and a Cr

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layer sputtered onto the magnetic layer (see abstract). The structure is then heat treated to diffuse Cr from the upper layer into the CoSm layer (see abstract and detailed description section of the translation, paragraph [0012]). Kobayashi is silent with respect to the amount of Cr that is diffused into the CoSm layer.

Kobayashi teaches that Cr helps improve coercivity and prevent oxidation of Sm in the CoSm magnetic layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the amount of Cr diffused into the magnetic layer in order to achieve optimal coercivity and oxidation prevention. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukai (US 5759617) in view of Marinero et al. (US 6268036).

Mukai discloses a magnetic recording medium formed by sputtering a non-magnetic underlayer on a substrate, sputtering a magnetic layer on the underlayer and then annealing to diffuse components of the underlayer into the crystal boundaries of the magnetic layer. The reference teaches that the underlayer is formed from a material such as Cr and the magnetic layer is formed from an alloy such as CoCr, CoCrPt (col. 2, lines 17-31 and 38-43; col. 2, line 66 to col. 3, line 13). The reference fails to disclose a bias voltage of 0V.

Marinero et al. teach that it is known in the art that the degree of incorporation of sputtering gases into a sputtered layer is a function of several things including bias voltage (col. 3, lines 58-66). The reference also teaches that any reactive species present in the sputtering



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gases will be incorporated into the lattice structure of the deposited layer and thereby affect lattice parameters and crystal structure. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the bias voltage in the sputtering steps taught by Mukai in order to adjust the lattice parameter of the underlayer and thereby optimize lattice matching with the magnetic layer. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

13. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi (JP 8-329464) in view of Marinero et al. (US 6268036).

Kobayashi discloses a magnetic recording medium having a Cr underlayer that is sputtered onto a substrate, a CoSm magnetic alloy sputtered onto the Cr underlayer and a Cr layer sputtered onto the magnetic layer. In the instant case, Sm corresponds to the claimed "non-magnetic material different from Cr and Co." The reference fails to disclose a bias voltage of 0V.

Marinero et al. teach that it is known in the art that the degree of incorporation of sputtering gases into a sputtered layer is a function of several things including bias voltage (col. 3, lines 58-66). The reference also teaches that any reactive species present in the sputtering gases will be incorporated into the lattice structure of the deposited layer and thereby affect lattice parameters and crystal structure. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the bias voltage in the sputtering steps taught by Kobayashi in order to adjust the lattice parameter of the underlayer and thereby

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optimize lattice matching with the magnetic layer. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

14. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukai (US 5759617) in view of Gui et al. (US 6153284).

Mukai discloses a magnetic recording medium formed by sputtering a non-magnetic underlayer on a substrate, sputtering a magnetic layer on the underlayer and then annealing to diffuse components of the underlayer into the crystal boundaries of the magnetic layer. The reference teaches that the underlayer is formed from a material such as Cr and the magnetic layer is formed from an alloy such as CoCr, CoCrPt (col. 2, lines 17-31 and 38-43; col. 2, line 66 to col. 3, line 13).

Mukai is silent with respect to the use of a spindle motor, a magnetic head, and an actuator.

Gui et al. teach that a conventional magnetic disk drive includes a magnetic recording medium, a disk drive motor with an associated spindle, a magnetic head, and a head actuator (col. 2, lines 30-41).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the magnetic recording disk taught by Mukai with a spindle motor, magnetic head, and actuator as taught by Gui et al. in order to produce a functional disk drive.

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15. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi (JP 8-329464) in view of Gui et al. (US 6153284).

Kobayashi discloses a magnetic recording medium having a Cr underlayer that is sputtered onto a substrate, a CoSm magnetic alloy sputtered onto the Cr underlayer and a Cr layer sputtered onto the magnetic layer. The structure is then heat treated to diffuse Cr from the upper layer into the CoSm layer (see abstract and detailed description section of the translation, paragraph [0012]). In the instant case, Sm corresponds to the claimed “non-magnetic material” in the magnetic layer.

The reference does not state that the Cr that diffuses into the magnetic layer is present only at the crystal grain boundary of the Co alloy. However, it is the Examiner’s contention that Kobayashi necessarily satisfies this limitation by virtue of the fact that the same method is used to make the claimed product and the product disclosed by Kobayashi.

Kobayashi is silent with respect to the use of a spindle motor, a magnetic head, and an actuator.

Gui et al. teach that a conventional magnetic disk drive includes a magnetic recording medium, a disk drive motor with an associated spindle, a magnetic head, and a head actuator (col. 2, lines 30-41).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the magnetic recording disk taught by Kobayashi with a spindle motor, magnetic head, and actuator as taught by Gui et al. in order to produce a functional disk drive.

***Claim Rejections - 35 USC § 102/103***

16. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kobayashi (JP 8-329464).

Kobayashi discloses a magnetic recording medium having a Cr underlayer that is sputtered onto a substrate, a CoSm magnetic alloy sputtered onto the Cr underlayer and a Cr layer sputtered onto the magnetic layer. The structure is then heat treated to diffuse Cr from the upper layer into the CoSm layer (see abstract and detailed description section of the translation, paragraph [0012]). In the instant case, Sm corresponds to the claimed “non-magnetic material” in the magnetic layer.

The reference does not state that the Cr that diffuses into the magnetic layer is present only at the crystal grain boundary of the Co alloy. However, it is the Examiner’s contention that Kobayashi inherently satisfies this limitation by virtue of the fact that the same method is used to make the claimed product and the product disclosed by Kobayashi.

Specifically, the claimed underlayer and magnetic layer are sputtered and Kobayashi teaches sputtering the underlayer magnetic layer and Cr overlayer. More importantly, both structures are heat treated at a temperature above 350° C. It has been held that where claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC §102 or on prima facie obviousness under 35 USC §103, jointly or alternatively. *In re Best, Bolton, and Shaw*, 195 USPQ 430. (CCPA 1977).

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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Rickman whose telephone number is (703) 305-2642. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read "Holly Rickman", with a stylized, flowing script.

Holly Rickman  
Examiner  
Art Unit 1773

hcr  
May 17, 2002